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ABSTRACT

This paper describes computer-mediated distance learning experiments in field settings by a rural teacher education program, in which student teachers and a student teaching seminar leader at Northern Michigan University conferenced via electronic mail. Participating student teachers, who were teaching in schools 300 miles apart, were expected to read all class mail weekly and send at least one message to the class each week. Evaluation of the program found that some students faced major problems in getting the system to work, locating a place in the school to set up the computer, and making the necessary telephone connections from the school. Student teachers used the network primarily to share and communicate with their peers. Very little communication was directed either to or from the seminar instructor. Participants reported that the main advantage of the project was the ability to share experiences with one another, and the main disadvantage was the lack of face-to-face contact. The project was not successful in enlisting the participation of first-year teachers or supervising teachers, even though they were offered free use of hardware, software, and telephone lines. Program implementation recommendations are offered. (JDD)

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Computer Mediated Support for Student Teaching and First Year Teaching

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This paper will describe computer mediated distance learning experiments in field settings by a rural teacher education program, briefly present format considerations, and discuss distance learning implications for education through field experiences for teachers.

The technology of development and education is changing at a phenomenal rate. Almost two decades ago the Carnegie Commission called electronic technology the greatest instructional revolution in five hundred years. Of the latest technological developments, telecommunications and computers have been the most influential. These developments have tremendous potential for solving some of the practical problems of education throughout the world. The potential benefits for the training of teachers in field settings is very great.

However, it should be kept in mind that such claims have been made about other new technologies, such as television, but we are yet to experience their revolutionary benefits in the classroom. Often the great claims for new technologies come from their proponents and rarely live up to their claims. This does not mean we should not explore these new technologies for their benefits, only that we should be wary of unsubstantiated claims. We should also know that such "advances" often have negative unanticipated results and change our lives in ways not intended, as has been true with television. We may realize these negative influences after it is too late. Therefore, it is worth considering what is lost, sacrificed or changed by using new technologies, before we rush headlong into their acceptance.

We are still at the very beginning stages of using current telecommunications technologies in field settings, and much more needs to be learned about how they can be best used. Various modern distance learning systems employ telecommunication devices to connect learning centers at two or more sites. This type of teleconferencing using computers is not frequently used as a teaching tool in preparing teachers (Harrington, 1993) and is relatively new (Bull, Harris, Lloyd, and Short, 1989). Rural areas, because of limited funds, smallness of numbers, distance from available resources, geographical separation, and limited educational opportunities, can benefit greatly from distance learning systems.

This study reports on the use of computer conferencing through e-mail with student teachers and a student teaching seminar leader at the Northern Michigan University (NMU). This type of computer conferencing has been referred to by several names, such as computer mediated communication or interactive computer networking. This type of conferencing has been employed through systems such as BITNET and INTERNET to connect users at different locations through mainframe computers so that they can easily communicate with individuals or with groups interested in topics of mutual concern. NMU employed a similar model in setting up its computer conference with student teachers and first year teachers.

Advantages and Disadvantages of Computer Conferencing

Computer conferencing has several advantages over face-to-face discussions. It allows for asynchronous discussions without the limitations of time or place. Students can say as much as they want and what they want without being interrupted or influenced by the others in the class. They can reflect on their thoughts and revise them if desired before they are shared with the other discussants. They can save their comments and the other participants' comments for future consideration. They can choose what topics they wish to comment on and which ones to ignore by entering into selected discussions and not responding to others. Computer conferencing places less emphasis on the socio-political aspects of a discussion and places more emphasis on what is said. Some people able to be more open and frank in their discussions through a distance network.

Some of the disadvantages of computer conferencing over face-to-face conferencing include problems with expressing and understanding ideas and feelings in writing, difficulty using the computers and technology associated with communicating, not having the nonverbal feedback and other supports available in face-to-face discussions, and the lack of immediacy of feedback. The impersonal nature of the media may also influence the value placed on the conversations and confusion can occur with messages being read out of context. The access, costs and maintenance of the equipment, software, and transmission of messages is a major impediment in most cases.

Journaling has many of these same advantages as computer conferencing over face-to-face conferencing, but computer conferencing has the advantage over journaling of the ease of conveying the information. The information is transferred to all participants immediately without the cost or inconvenience of copying and mailing. With e-mail conferencing, you can choose to talk with the whole class or just a select individual or group. Instead of making and distributing copies of your journals to the individuals in your discussion group, one message is distributed to everyone immediately which increases the interactive quality of the discussions.

The disadvantages of computer conferencing over journaling are a) students who are unfamiliar with the technology may be hesitant to use it; b) the need for and cost of advanced technology, i.e., computers, telephones, and long distance calls as compared to simple paper and pencil; c) the training needed to allow participants to converse using computer conferencing; d) the potential hardware, software and transmission problems and e) the problem of needing to be where the tools are before you can communicate.

NMU Student Teaching Computer Network

Northern Michigan University (NMU) places student teachers throughout the

Upper Peninsula of Michigan and Northern Wisconsin. Many of these student teachers are isolated from the University campus and each other. In February 1992, a grant proposal was submitted to the NMU Learning Technology Fee Committee requesting $6,000 to purchase 12 inexpensive computers and modems, as well as the necessary software to communicate with the e-mail and conferencing system at NMU. This grant application had letters of support from the Chair of the Department, Dean of the College, and area educators, and the support of the Department of Education faculty. The Learning Technology Fee Committee of NMU granted us 14 IBM 5150 personal computers (old model, used computers available from Academic Computing because of upgrading) and $1,500 to purchase modems and other support materials. We were also able to use communications software (PCWS) that the University had for linking the IBM personal computers to Northern's mainframe computer which runs the communications system. With the $1,500 we purchased 14 internal modems (2400 baud) for the IBM computers ($669 for 12 internal modems and $160 for two internal modems with fax capability), three external modems (2400 baud) for Macintosh computers ($270), 60 blank 5 1/4 inch diskettes ($23), and 21 reference guides for using the system ($49), for a total cost of $1171. The remaining $329 was used to cover miscellaneous costs such as long distance telephone charges, repairs, printing, and postage to mail information to the participants. The three external modems were bought for those schools and students who already had Macintosh computers that they would prefer using, but needed a modem so that they could be connected to the system. Macintosh users connected with either Red Ryder or White Knight communications software. The blank disks were used for distributing University communications and word processing software to the participants and for storing messages. The guides explained how to use NMU's interactive computing system, MUSIC.

These computers, modems, software and other materials were loaned by the university to our student teachers or first year teachers who volunteered and were selected to participate in this project. The participants had access to the electronic mail services through the University and to a specialized bulletin board related to student teaching. All parties were encouraged to contribute regularly to the on-going discussions related to becoming a teacher. NMU's mainframe computer can be accessed with an assigned ID and a password via mainframe terminals on campus or personal computers with modems and communications software. All participants were issued an individual ID that allowed access to NMU's system and a "mailbox" to receive e-mail. They were all included on a class mail list that allowed participants to send one message to the class that would be sent to every individual in the group.

Of the systems running on NMU's mainframe, students connected to MUSIC (from MUSIC/SP--Multi-User System for Interactive Computing/System Product, but hereafter and on campus referred to as MUSIC) which allows for time sharing to support interactive computing and batch operations with a number of options, such as e-mail, on-line inter-library card catalog, electronic conferencing, statistical programs and varied information, facilities, and

utilities. Although all of these options were available for our participants to use, we hoped to increase their effectiveness and learning primarily through the electronic mail facility (MAIL). This facility enabled our participants to send and receive messages from other MUSIC users. Because NMU had BITNET available on MUSIC, our participants also had access to this service which allowed them to access this worldwide network of individuals and groups.

The MAIL facility menu allows the users to see how many pieces of incoming new mail, incoming old mail, acknowledgements waiting and unreceived outgoing mail they have. It also allows them to read, create, and send mail, and other facilities such as transferring, copying and forwarding mail. Our participants, primarily student teachers, had the option of sending a letter to an individual or to our whole class. Even messages to the whole class could seem like a personal letter to each individual. With the e-mail option of communicating with the whole class, it became like a conference that allowed the students to carry on discussions and to share their thoughts about their own experiences with the other participants when they could find time to do so.

There were no additional space requirements nor on-going cost for the University. Older IBM compatible computers were equipped with internal modems and software for fifteen student teachers and their supervisors, as well as a limited number for first year teachers. The participating school districts were required to pick up the phone expenses in exchange for unlimited use of the computer and modem when not needed for this program. There was some training on use of computer mediated communication needed for the involved University personnel, student teachers, first year teachers and support personnel in the field. These training needs were met through existing training programs available to faculty and students at the University and were further supported by the Department of Education, primarily through the instructor of the seminar and a graduate assistant who helped with the project.

All students who student teach at NMU are required to also take a one credit course concurrently with their student teaching, ED 450 Seminar in Teaching. This seminar normally meets five times during the semester and the students are required to keep journals related to their student teaching. These journals are turned in at each seminar and are read by the professor and returned to the students at the next seminar. The students for both the fall and winter semester computer networking groups were volunteers from among the student teachers who participated as part of meeting their seminar requirements. In both cases we limited the number of participants as there were more who wanted to participate that we could accommodate. By using only volunteers, we were able to eliminate the disadvantages of having participants who were not interested in computers, telecommunications, and the project goals. Only two students in each group had used MUSIC before their participation in this project, although most had used computers.

Fall Semester Study

During the student teaching orientation meeting for student teaching the semester before the students begin their student teaching, a sign up sheet was passed around the group for those who would be interested to participate in the computer networking pilot if it was funded. Students were informed that participation in this project met the requirements of the regular ED 450 Seminar in Teaching.

From that list of the 36 who volunteered to participate, 18 students were selected based upon their groupings, location and diversity of fields. If more than one student in a building was interested, than we favored those individuals as they could assist one another and would only require one computer among them. We also chose participants so that we could have a broad range of locations, as well as a diversity of teaching levels and subject areas so that we would have a broad sampling from which to evaluate the project. The students in the fall group were spread over a large geographical area, the farthest being over 300 miles apart from each other.

Letters were sent to those chosen to participate in the project at the beginning of the semester to inform them of their selection to this special computer mediated seminar and their meeting dates. A letter was also sent the supervising teacher and principal of each student teacher to briefly explain the program and to encourage their support. Those not selected were sent letters informing them of the meeting dates for their regular seminar.

Besides the attraction of being involved in an innovative program, the students were given the added incentives of only having to attend two seminars as opposed the regular five required of other students in ED 450, Seminar in Teaching. They also did not have to do the journals required in the seminar as the computer conferencing was taking its place. The most common response to the post assessment question, "Why did you volunteer to be involved in this pilot computer project?" was because they thought it would be interesting and they wanted the opportunity to be involved in the project.

The first session, during the beginning of the semester, was to meet one another, learn about the project, learn how to use the communication system and to pick up the necessary hardware and support materials. The students' computer background ranged from none to extensive, with most having a good familiarity with computers. The second and final time the group met was at the end of the term to return the materials, debrief, and evaluate the project. These sessions were about three hours long each. The students were also invited to participate in a third session on placement and employment with the other student teachers, but this session was not related to their participation in the computer network.

During the fall 1992 semester of using the e-mail network with our student teachers, they were expected to read all class mail weekly and to send at least one

message to the class each week. Because of many difficulties, few met this expectation. The major obstacle the students listed as preventing them from effectively communicating was getting the system to work. This included problems with computer equipment, connection, software and lack of knowledge.

Some students faced a major problem trying to get a place in the school to set up the computer or trying to get the telephone connections from the school to work. It seem that school systems that had switchboards or multiple numbers coming into one telephone, would either not allow the computer software to connect or they would get disconnected whenever an incoming call would be received on one of the other numbers used by the school. We also had student in school systems that had antiquated telephone hook ups and had only two numbers for the entire school. This created problems of hook up and availability. In the end some students either were not successful in making the connections or got around these problems by taking the computers to their homes and sending messages from there, using friends computers that were already set up for telephone connections, coming to campus to use mainframe terminals located around the campus, or using an established automated computer network set up between the University and several regional libraries, including some school libraries. One student opted out of the project because the difficulties getting the system to work and, after investing much effort and time, began attending the regular seminars to meet the requirements for the required course.

Fall Semester Results

This program was evaluated based upon the level of use and the perceived value as measured by survey instruments and interviews of the participants. The level of use varied from participant to participant with some only being able to log on twice during the term to those who logged on over ten times. Of those who did not use the system much, the main reason was the difficulty of making connections. Those who logged on more frequently seemed to have fewer problems making connections, were more comfortable with the equipment and process, were more persistent and/or responsible, and were more dedicated to communicating through writing with their peers.

The student teachers primarily used the network to share and communicate with their peers. Very little communication was directed either to or from the instructor of the seminar in the fall group. The students enjoyed logging own and having mail waiting for them. Three stated they used the network at home, eight at school and one at a friends home. Half of the twelve respondents to the question of where they would prefer to have the computer said they would prefer to use the computer at home because of the convenience. The other half felt that school was better because of access during the day and for having others use it if they wanted to participate.

The fall student teachers were also expected to place at least one entry onto the student teaching e-conference. The e-conference had subtopics related to student

teaching such as classroom management, elementary, secondary, supervising teacher issues, and evaluation. Through this facility the users would get to see what others have said regarding certain topics and to say what they want in response or in addition to that topic. Because of technical difficulties, they were not able to use it. It is hoped this can become a valuable vehicle for discussion of issues related to student teaching, as well as a place to access information such as departmental news, evaluation forms and the student teaching guide.

When asked to write anonymous comments at the end of the project about what they liked about the seminar, the students said such things as: "talking over the problems," "addressed my concerns," "helped me to reflect on my experiences student teaching," "helpful advice," "being able to communicate," "well organized," and "the instructors were very helpful." These course evaluation comments of the students in the computer users seminar did not vary that much from comment to the same question by students in the same professor's regular seminar, although the regular seminar participants seem to comment more regarding the value of the opportunity to share with their peers and the information received.

However, the computer seminar students' comments about how could the seminar be improved were generally quite different from regular seminar students' responses to the same question. The computer seminar students focussed more on the computer application in this item of the evaluation:

> With the computer, I felt that I was just writing and not really sharing my experience because of the slow response. Most of the time I did not get a response from people on the computer.
>
> The computer seminar could be improved by making sure all the equipment works properly and instructions for long distance people are provided right away.
>
> Use the computer as a supplement to the seminar--perhaps in place of the journal.

The other comments related to having more meetings and smaller groups. Comments to how the seminar could be improved in the regular seminar generally refer to having more information about a certain topic, especially how to get a job, less journaling or some aspect related to the organization of the seminar.

In a post assessment survey the participants were asked to respond to a number of questions. The participants listed being able to communicate and share experiences with one another as the main advantage of the project. The major disadvantage cited was the lack of face-to face contact. The other disadvantages included limited access to computer, getting time to use it, and the amount of time

involved. The student felt more training on the computers and better instruction on connecting to Northern's MUSIC system was needed.

Winter Semester Project and Preliminary Findings

As a result of our fall piloting of this computer mediated conferencing among student teachers we made some changes. From the students' evaluations, we decided to not have a separate seminar for those using the computer network, but to allow students in the project attend regular seminars computer conference in place of completing journals. We made this change because even though the students could communicate using the computers, they still wanted to meet one another face-to-face to discuss the experiences and relevant issues. Only students in the professor's seminar of 20 elementary student teachers and his seminar of 20 secondary student teachers were given the option of participating in this project. The volunteers from these two seminars would be required to attend a separate training session to learn how to use the computer network and to pick up their computers and other materials.

Because some of the fall students failed to meet the expectations and the minimal requirements were not clearly communicated, we developed a statement of understanding that all students were to sign that stipulated very clearly their requirements of participation. The agreement stated:

> 1. I will participate via computer on a weekly basis in place of keeping a journal.
> 2. I agree to send a message via computer for a minimum of ten times to meet my journal requirements for seminar.
> 3. I agree to take care of all equipment and software issued to me and return it in good condition. I will be responsible for any destruction of property caused by my negligence.
> 4. I understand I am to attend my assigned seminar.
> 5. I will return any materials when requested.
> 6. I will use the bulletin board on the computer at least once during the term and put a message with my name on it.
> 7. I understand that NMU will not be responsible for any added expenses (telephone, hardware, software, etc.) not expressly written.
> 8. I understand I am responsible to find a safe place to keep the computer.
> 9. I understand I am responsible to try to solve any problems I may have using the computer in a timely fashion.

The winter semester was still in progress when this paper was written, but some preliminary information is available. Twelve students originally volunteered to participate, but because of school telephone problems, two decided to discontinue. As a result these two completed journals like the regular seminar students instead of computer conferencing. In neither the fall nor winter groups of volunteers did any gender, age, grade level or subject seem to be more represented

or predominate. It seems the determining factor for self selection was interest in computer networking. When asked in the initial training session at the beginning of the winter term why the volunteers were interested in participating in this project, the main response was because of their interest in computers and communication.

In the fall of 1992 we had a bulletin board (e-conference) set up, but because of no first hand instruction, the lateness of getting it set up and the limitation to its access, it was not used. The bulletin board/electronic conference had the following topics: student teaching, information/new form NMU, supervising teachers, student teacher guide, student teaching evaluation forms, elementary student teaching, secondary student teaching, classroom management, Teacher Education Advisory Council, and employment opportunities. The participants were to be able to choose any of these topics to read about and to respond to as they wished. This system still has not been used by the students, partly because of difficulties in inputting information, and partly because it is not as dynamic as the e-mail network.

Differences between the fall group's utilization of the computer network and the winter group's was in terms of quantity of messages and type of messages. The differences seem to be attributable to the initial patterns established in communication. The winter group had clearer and higher expectations because of the agreement. The instructor had the students focus on problems encountered in the fall group during the training session so as to avoid repeating those problems. Also, because most of the bugs had been worked out of the computers and software in the fall, many of the problems that hindered communications were eliminated. The students were generally successful in setting up, making connections, and successfully sending and receiving messages. All of these factors caused a quicker and more positive experience with the system and therefore should have been more encouraging to the participants.

The instructor also began responding quicker and more to individuals than to the class as he had done in the fall. This seemed to establish a pattern of communication that was also reflected in the students communication with one another. Several students commented that they were communicating more to individuals than to the whole class. This communication was not available to the investigator and the ability to evaluate it both in terms of quantity and quality is not present, however the level of conversation in the individual messages he received seemed to be more personal and deeper then messages sent to the general class. It is an indicator of intrinsic value as this individual communicating as it is over and above the class requirements and the only reward in the value the participants get from it.

The differences seemed more among the individuals of the groups than between the two groups themselves. In each group there were those who seemed to look forward to sending and receiving mail, and others who, even though they volunteered for the project, seemed to only go through the motions to meet

minimal requirements. It is not clear what the differentiating factors between these two attitudes are, but it seems to be reflected in the student's personalities. The more social, spirited and communicative students seem to participate more. Data from research using computer networks to support beginning teachers found that high users ranked the computer network higher in effectiveness for providing moral support and reflection of educational issues than did low users (Merseth, 1991). The results of this same study seems to confirm the author's perceptions, based upon the content of the students' messages and their evaluation comments, that the student teachers participated more in the network for moral/personal support reasons than for information.

Recommendations

One of the serendipitous outcomes of this project was the learning that many of the schools were already networked to NMU through the Computerized Regional Information System to Access Libraries (CRISTAL). This came about when one of our students, who had trouble accessing the MUSIC network with the software and computer we had given her, found that she could easily gain access through the CRISTAL network with a direct line the mainframe at NMU and is related to the MUSIC network. CRISTAL is an online library catalog that connects a number of libraries in the region to one another and makes available to participants the resources of the combined libraries. It is recommended that this established computer connection also be used to access the other services available through NMU's mainframe computer. This can further enhance the attractiveness of CRISTAL to regional libraries as well as increase our connectedness to the region, especially the schools and our students in those schools.

It is also recommended that no one begin a distance learning project if they are not prepared for the many inevitable problems that occur with the hardware, software and telecommunication connections. Personnel need to be available to work out these problems and the participants need to be committed enough to give the extra time and energy required to complete the project. It often takes more time and has more problems than expected.

Even though the computer allows for more contact with peers and others, the students still wanted to have face-to-face contact. As a result of this concern, we had the second group attend regular seminars in addition to computer networking. Another option that might be better is to have five regular meetings, but to have them with only those who are participating in the computer network. Because the winter participants are a minority in the regular seminars (about 5 out of twenty students), the computer group never had a time for face-to-face discussion with their peers on the computer network about issues that may be of special interest to them, unless they made time to talk with the others on their own time. If all of the networked students were in the same seminar, discussions could be directly related to their concerns and a more support and direction given to them.

This project was intended to also involve first year teachers as well as supervising teachers. We tried to get first year teachers and supervising to participate in the computer network with student teachers, but were largely unsuccessful. Even direct contact to recruit recent graduates who had just began teaching were not successful in getting volunteers to participate. The press of their work and the limited rewards seemed to be the main reasons new teachers gave for not participating. The research suggests that the first year of teaching is a time of much adjustment and stress. First year teachers also tend to be reluctant to let anyone know that they are having any problems as they are trying hard to prove themselves to both the others they are working with and to themselves. We were only able to get two first year and one supervising teacher to agree to participate, but in the end only one of the first year teachers ever sent a message, and she only two short ones. The other two returned the equipment loaned to them unused after we were unable to get them to use it. The rewards for supervising teachers are limited, and few seem to have an intrinsic interest to get involved in a project that will require more time and effort of them. Efforts will need to be made to make participation more attractive if we are to be successful in getting first year and other teachers involved in computer conferencing.

Computer networking has much potential with beginning teachers (Merseth, 1991). The need to support beginning teachers and to assist them in the induction process is well recognized. In our rural region, it is difficult to give that support and assist in the transition because of geographical distances. NMU has tried several specific approaches to assist our graduates who are beginning teachers in our region, but these have been unsuccessful because of lack of participation by the beginning teachers. It is recommended that a special course be set up for first and second year teachers that would be patterned after the student teaching seminars using the computer network. This course would start in the summer and meet periodically to discuss issues of concern to beginning teachers. Each student would be issued a computer and would be expected to be regularly communicating with the class on the agreed topics in between meetings. Readings would be given on the chosen topics and reactions shared on the network and later in the seminar. Because of the greater confidentiality and anonymity available in communicating through e-mail and the greater opportunity to address issue of concern to them without worrying about the repercussions of being candid and open at their work place, the beginning teachers might be more receptive than otherwise.

Conclusion

Computer networking or conferencing offers many possibilities for linking student teachers, first year teachers and support personnel together and offering increased support and information to all involved. By supplying our student teachers, first year teachers and support personnel with the equipment and training to communicate with university personnel, electronic services and one another through NMU's mainframe computer, we hoped to increase the amount

and quality of reflection on classroom practices. By allowing the participants to engage in a nonthreatening sharing of their experiences and reflections with others, it was hoped that students would feel more support and gain new insights from others. This computer mediated communication increased our contact with participating student teachers in the area schools and allowed for greater professional development; however, this could have probably be achieved more easily, and maybe more efficiently, by having the students meet together in a common session more often or by assigning them to mentors at the university to call on the telephone weekly to discuss their student teaching.

We were not successful in enlisting the participation of either first year teachers or supervising teachers, even though we were offering them free use of the computer and software and were willing to pay any long distance telephone expenses. More will need to be done to make their participation attractive to them.

An electronic conference (bulletin board) for student teachers was not successful because of difficulties accessing this e-conference. Improvements will need to be made in accessing this e-conference and it needs to be made more attractive for the participants.

The launching of such a project takes much time and effort, even when things go well. For students and faculty to read all of their e-mail and to respond to it also takes effort and time. Both the course evaluations of the students who participated in the computer seminar and those in the regular seminar rated the instructor and course equally high. Whether the effort and expense is worth it is a question that will depend in individual circumstances. It is hoped that this study will give more information with which to make reasonable judgements about the value of using computer networks with student teachers and first year teachers.

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